

FINAL GUIDELINES FOR WATER BODY CLASSIFICATION



Missouri Department of Natural Resources
Water Protection Program

Approved by the Missouri Clean Water Commission
March 2, 2005

Water Classification Evaluation Procedures

The following evaluation procedures are proposed. It is recommended that future revisions of State Water Quality Standards, 10 CSR 20-7.031, consider the need for additional or alternative beneficial use classifications that better define the use expectations of selected waters and that would allow for even more definitive guidance than is present in the following evaluation procedures.

1. Background

The Missouri Clean Water Law (Chapter 644 RSMo) and the surface water quality standards (10 CSR 20-7) establish water quality goals for all waters of the state. Waters of the state are defined as

All rivers, streams, lakes, and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased, or otherwise controlled by a single person or by two or more persons jointly or as tenants in common and includes waters of the United States lying within the state.

Classified waters are an important subset of the waters of the state as they are required to meet specified beneficial uses and are subject to numeric water quality criteria designed to protect those uses. The procedures discussed in this document are intended to provide guidance for staff to use in developing recommendations regarding the proper classification of the state's waters. Any change to a waters classification and any additions to the list of classified waters will be done through the state's rulemaking procedure.

2. Waterbody Classifications

Waterbody classifications are given in 10 CSR 20-7.031(1)(F) as follows:

Classified waters--

During normal flow periods, some rivers back water into tributaries, which are not otherwise classified. These permanent backwater areas are considered to have the same classification as the water body into which the tributary flows.

- 1. Class L1-- Lakes used primarily for public drinking water supply.*
- 2. Class L2-- Major reservoirs.*
- 3. Class L3-- Other lakes, which are waters of the state. These include both public and private lakes. For effluent regulation purposes, publicly owned L3 lakes are those for which a substantial portion of the surrounding lands are publicly owned or managed.*
- 4. Class P-- Streams that maintain permanent flow even in drought periods.¹*
- 5. Class P1-- Standing-water reaches of Class P streams.*

¹ Class P and C streams were originally taken from a Department of Conservation publication, "Missouri Fishing Streams" D-J Series No. 5. The author was John Funk and it was published in 1968. The publication lists streams by name and gives segment lengths for permanently flowing portions and segments with fishable pools. The report notes the original data were observations made during prolonged dry periods in the 1930s and says that many of these streams were re-visited during a dry period in the 1950s and these observations compared well with those made in the 1930s.

6. *Class C-- Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.*

7. *Class W-- Wetlands that are waters of the state that meet the criteria in the Corps of Engineers Wetlands Delineation Manual (January 1987), and subsequent federal revisions. Class W waters do not include wetlands that are artificially created on dry land and maintained for the treatment of mine drainage, stormwater control, drainage associated with road construction, or industrial, municipal or agricultural waste. Class W determination on any specific site shall be consistent with federal law.*

3. Guidelines for Lake Classification

Guideline 3.1. L1 Lake: Lake meets the definition of ‘waters of the state,’ serves as a public drinking water supply source and the surface area at full pool is less than 1500 acres.

Guideline 3.2. L2 Lake: Lake meets the definition of ‘waters of the state,’ full pool area is 1500 acres or more in size and lake maintains more than 15% of its full pool area throughout the year in three out of four years.

Guideline 3.3. L3 Lake: Lake meets the definition of ‘waters of the state,’ full pool area is less than 1500 acres in size and lake maintains more than 15% of its full pool area throughout the year in three out of four years.

Note: The current lake classification is inconsistent with regard to area. For example, Clearwater Lake is currently an L2 lake of 1,650 acres while Silver Lake is an L3 lake of 2,464 acres.

Note: Several waters currently classified as L3 lakes such as the pools within Squaw Creek National Wildlife Refuge (NWR), Swan Lake NWR and Ten Mile Pond in Mississippi County are very large but shallow lakes that are totally de-watered or nearly so at least once every two or three years. These waters would not meet the 15% full pool guideline in three years out of four and will be proposed to be deleted from the list of classified lakes and added as classified wetlands, Class W in a future rulemaking.

Public vs. Private L3 Lakes

Missouri’s Effluent Regulation 10 CSR 20-7.015 distinguishes between public and private L3 lakes with regard to effluent limits. At 10 CSR 20-7.015(3) it prescribes a minimum effluent limit of 20 mg/L BOD and 20 mg/L NFR for “..a lake or reservoir designated in 10 CSR 20-7.031 as L2 or L3 which is publicly owned” and assigns treatment limits (less stringent than 20 BOD, 20 NFR) given at 10 CSR 20-7.015(8) for discharges to private lakes.

In its definitions, State Water Quality Standards, 10 CSR 20-7.031(1)(F), state in part “..*Class L3--Other lakes, which are waters of the state. These include both public and private lakes. For effluent regulation purposes, publicly owned L3 lakes are those for which a substantial portion of the surrounding lands are publicly owned or managed.*” Thus, the Water Quality Standards appear to distinguish between public and private lakes in this

definition but in no other part of the Standards are individual lakes identified as public or private.

The hydrology, water chemistry and response to pollutant discharges are the same in public and private lakes. Thus, both have similar water quality protection needs and should be given equal protection. Staff will not characterize L3 lakes as either “public” or “private,” and recommend that references to “public” versus “private” L3 lakes be removed from the Water Quality Standards Rule and the Effluent Rule in a future rulemaking.

4. Guidelines for Wetland Classification

Guideline 4.1. Field assessments should be done in accordance with the U.S. Army Corps of Engineers “Wetlands Delineation Manual.” If the candidate area meets the criteria for any wetland type noted in this manual, the candidate would be judged to be a classified wetland.

This manual can be found at the following Web site:

(<http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf>). Unlike the determination of Class P and C streams, the classification of wetlands may be done during any hydrologic conditions.

Field activities will generally begin with a visual inspection of the targeted waterbody at several randomly selected locations. If anecdotal information is given regarding locations of possible sites, then those sites should be included in the survey.

If access to the area is through private property, landowner or resident consent should be obtained prior to accessing the property.

All assessment sites and wetland boundaries should be clearly marked on 1:24,000 (7.5 minute) USGS topographic quadrangle maps. Global Positioning System (GPS) coordinates and EPE (error of reading) of each site should be taken on-site and recorded in the field notes.

Narrative site assessments should be clearly recorded, either in electronic or written format, at each assessment site. This is to eliminate the risk of confusion between multiple site observations. Note any structures that may facilitate or obstruct re-propagation of aquatic life in the wetland.

A photographic record should be made of each site during the site assessment. Photographs should be catalogued in the field notes in a manner that indicates the site location, date, view orientation and what is being shown.

At a minimum, dissolved oxygen, pH, specific conductance, and temperature should be measured at each assessment site when possible and documented in the field notes. Sample collection should be consistent with the methods outlined in *Standard Methods for the Examination of Water & Wastewater, 20th Edition* and any subsequent editions.

If possible, local landowners and residents should be interviewed regarding the history of the waterbody in question. Interviews are to be clearly recorded, either in electronic or written

format. Persons interviewed should be identified by legal name and address in the field notes and written report. Biological community sampling will focus on determining the presence or absence of hydric vegetation. Soil sampling will focus on determining the presence or absence of hydric soils. Hydrologic surveys should be conducted when possible to document evidence of inundation.

5. Guidelines for Determination of a Drought or Dry Period

The current definition for Class P streams requires only that the stream maintain flow during drought periods. The current definition for Class C streams requires that the stream maintain permanent pools that support aquatic life during dry periods. The following guidelines define the period under which field measurements will be made for both Class P and C determination.

A “drought” or “dry period” for the purposes of determining stream classification must meet all four of the guidelines below.

Guideline 5.1. Streamflow at the nearest USGS gauge (excluding gauges on the Missouri and Mississippi Rivers and those downstream of L2 lakes) with at least 30 years of record² is less than the 20th percentile of mean weekly streamflow.

This data may be obtained from the USGS Web site http://water.usgs.gov/cgi-bin/dailyMainW?map_type=dryd&state=mo. Include a copy of the station webpage including the data table at the bottom showing the percent exceedence (the 80% exceedence value is the 20th percentile flow value) in the final report.

Guideline 5.2. The watershed has received less than 75% of the normal precipitation over the preceding three (3) months as determined from at least thirty years of record.³

This data may be obtained from the Missouri Climate Center Web site: <http://www.mcc.missouri.edu/monitoring/prcpdev2-90days.gif>. Include a copy of the webpage in the final report.

Guideline 5.3. The watershed received no 24-hour rainfall totals in excess of 0.25” and no more than 0.5” total rainfall in the preceding two (2) weeks.

Guideline 5.4. The above flow and rainfall conditions occur between July 1 and September 30.

Note: These web sites do not allow documentation of past conditions. The printed web pages showing that drought conditions were met need to be generated prior to fieldwork. All fieldwork should be done within the first 72 hours after the date the web

² The name and location of the gauges in and near Missouri with at least 30 years of flow record are given in Appendix A.

³ This criterion is likely to be met in about one year in six or seven, based upon an estimate that the probability of three consecutive months receiving less than 60% of mean precipitation at Columbia, Missouri, for April through October is 13% or about one year in eight. “Atlas of Missouri Ecoregions” Nigh and Schroeder, MDC, 2002, p.10.

page information was accessed. No rise in streamflow or significant rainfall should occur between the date of printing the webpage materials and the fieldwork.

6. Guidelines for the Selection of Sites for Field Measurements for Determining Stream Classification

Stream classification guidelines should be applied as follows:

Guideline 6.1. For all candidate streams, the portion of the evaluated segment to which the criteria are applied, should be representative of the entire segment with respect to stream morphometry, substrate and geology.

Guideline 6.2. For determination of Permanency of Flow (Class P)

- *If the candidate segment for classification is less than 0.5 miles in length, the entire length of the candidate segment should be evaluated.*
- *If the candidate segment to be evaluated for classification is 0.5 to 1 mile in length, at least 50% of the candidate segment should be evaluated.*
- *If the candidate segment to be evaluated for classification is greater than 1 mile in length, at least 0.5 miles plus 25% of the candidate segment distance in excess of one mile should be evaluated.*

Guideline 6.3. For Determination of Permanent Pools Supporting Aquatic Life (Class C)

- *Candidate segments should be no more than 0.5 miles in length. If reclassification is desired for a stream segment greater than 0.5 miles in length, separate applications should be submitted for each 0.5-mile segment.*
- *If the candidate segment has three or fewer pools, sample all pools.*
- *If the candidate segment has four to ten pools, sample four pools.*
- *If the candidate segment has 11-20 pools, sample 5 pools.*
- *If the candidate segment has greater than 20 pools, sample 6 pools.*

7. Guidelines for Permanently Flowing Streams, Class P

Field activities should begin with a visual inspection of the targeted waterbody at several representative locations.

If access to the waterbody is to be made on private property, landowner or resident consent should be obtained prior to accessing the property.

The candidate segment should be clearly marked on 1:24,000 (7.5 minute) USGS topographic quadrangle maps. Global Positioning System (GPS) coordinates and EPE (error of measurement) of each site should be taken on-site and recorded in the field notes. Aerial photos may be included in addition to the topographic map.

Guideline 7.1. During the previously defined “drought” or “dry period,” the stream segment evaluated should have visible surface flow that is not wholly from an anthropogenic source. In addition, surface water should be present for at least 70% of the segment length.

8. Guidelines for Streams with Permanent Pools in Dry Weather that Support Aquatic Life, Class C

If access to the waterbody is to be made on private property, landowner or resident consent should be obtained prior to accessing the property, or a suitably restricted search warrant should be obtained by the department for its employees.

Persons conducting biological sampling should, at a minimum, be rated as “Level Two” by the Missouri Volunteer Water Quality Monitoring Program, or must have knowledge and experience in biological sampling of streams at least commensurate with a “Level Two” rating. Those persons conducting biological monitoring that are not a Missouri Volunteer Water Quality Monitoring Program participant with at least Level Two rating, should provide their name, address, organization they represent, if any, and a summary of their education and experience that qualifies them for biological monitoring.

Prior to collection activities, a scientific collectors permit must be obtained from the Missouri Department of Conservation. (Required by 3 CSR 10-9.425) If federally protected species are likely to be encountered, contact the United States Fish & Wildlife Service (USFWS).

8.1. Guidelines for Consideration of Candidacy

Final determination of Class C status will be made by a multiagency committee composed of aquatic biologists. A stream segment that is proposed as a candidate for addition as a Class C stream should meet both the following criteria before this committee will review it.⁴

Guideline 8.1.1. The thalweg⁵ distance of each 0.5-mile segment evaluated should be either

- *20% pooled*
- *Pool frequency exceeds 5 pools*

Guideline 8.1.2. Collection and field identification of aquatic invertebrates yields a diversity score of 7 or greater as calculated on the Stream Candidacy Field Data Sheet.

A Stream Candidacy Field Data Sheet should be filled out for each stream segment evaluated for Class C status. If the candidate segment does not meet these two criteria, no other

⁴ If the department believes that a candidate stream may fail to meet any of the biological guidelines in Section 8 (i.e., Guidelines 8.1.2., 8.2.1., 8.2.2., and 8.2.3.) due to water pollution, the multi-agency review committee may waive Guideline 8.1.2. The only exception would be the case where an anthropogenic condition exists which would have allowed the removal of the Protection of Aquatic Life beneficial use as per the US Environmental Protection Agency’s rule at CFR Section 131.3(G). In this case, the department would recommend the candidate water not be classified.

⁵ The line within the stream channel that marks the deepest portion of the stream channel.

fieldwork should be done and the field sheets should be submitted to the Department of Natural Resources. This segment is considered unable to meet the minimum criteria for a Class C stream.

8.2. Additional Field Studies and Guidelines Used by Multiagency Review Committee

If Guidelines 8.1.1 and 8.1.2 are met, additional field activities should begin with a visual inspection of the targeted waterbody at several representative locations. The number of pools sampled will be determined by Guideline 6.3. A Pool Survey Field Data Sheet and Aquatic Life Survey Field Data Sheet must be filled out for each pool surveyed.

The candidate segment and all pools sampled should be clearly marked on 1:24,000 (7.5 minute) USGS topographic quadrangle maps. Global Positioning System (GPS) coordinates and EPE (error of measurement) should be made at the upstream and downstream end of the candidate segment and the upstream and downstream end of each pool that is monitored, and recorded in the field notes. Aerial photos may be included in addition to the topographic map.

Narrative site assessments are to be clearly recorded, either in electronic or written format, at each pool sampled. Note any structures that may facilitate or obstruct re-propagation of aquatic life in the stream.

A photographic record should be made of each site during the site assessment. Photographs should include at least one photograph of each pool sampled and can include photos of observed or potential beneficial uses. Photographs should be catalogued in the field notes in a manner that indicates the site location, date, view orientation and what is being shown.

At a minimum, dissolved oxygen, pH, specific conductance, and water temperature should be measured at each assessment site when possible and documented in the field notes. Sample collection and analysis should be consistent with the methods outlined in *Standard Methods for the Examination of Water & Wastewater, 20th Edition*, and any subsequent editions.

If possible, streamside landowners and local residents should be interviewed regarding the history of the stream in question. A written record of the interview should accompany the other materials sent for review.

Field measurements will include physical measurements of pools and biological community sampling. Biological community sampling will focus on aquatic macroinvertebrates, and will include supplemental information on fish if they are present.

Macroinvertebrate sampling procedures should follow those given in Appendix B.

Macroinvertebrate samples should be hand picked, preserved in 70% alcohol and submitted to the Department of Natural Resources for review and evaluation.

The committee should judge the candidate segment to be a Class C stream if any of the following criteria are met. Guidelines 8.2.1 and 8.2.2 can be determined in the field. If neither of these guidelines are met, a macroinvertebrate sample must be submitted.

Guideline 8.2.1. Living Unionid Mussels present. Photo documentation required and mussels shall be immediately returned to the pool, unharmed.

Guideline 8.2.2. At least two families of fish are present within the candidate segment or if only one family of fish is present, they average at least 20 individuals per pool sampled.

Guideline 8.2.3. Aquatic macroinvertebrate diversity meets the criteria set forth in Appendix C.

9.0 Submittal of Request for Classification Change

The department requests that results of field surveys and all requested data be submitted regardless of whether or not the candidate streams meets all necessary criteria. A request for classification of presently unclassified waters, or a request for a change in the classification status of presently classified waters can be made by submitting documentation that the candidate water meets the established criteria for the requested classification. This documentation should describe the exact nature of the request, a detailed legal description of the water body in question, and presentation of all field data, specimens collected and other evidence that the waterbody in question meets the criteria specified for the desired classification. **A separate report must be submitted for each candidate.** Supporting documentation for the report may consist of any or all of the following items but is not limited to: topographic maps, aerial photographs, documentation of any existing uses, transcripts of landowner/local resident interviews (either recorded or written), photocopies of all field notes & summaries, and photocopies of laboratory analyses.

A Microsoft compatible copy of the requested information is recommended but not required. Send the completed report and all supporting documentation for review and evaluation to:

Missouri Department of Natural Resources, Water Protection Program, Water Quality Monitoring and Assessment Section, P.O. Box 176, Jefferson City, MO 65102-0176

The department will review the submitted material for accuracy, completeness and adequacy. The Missouri Department of Natural Resources, or any other partnering agency may perform Quality Assurance/Quality Control (QA/QC) procedures on any submitted material to ensure accuracy.

If the data in the report meets the established criteria, a recommendation to add or revise the water in question may be made to the Missouri Clean Water Commission. If approved by the Commission, the change in classification will be proposed for addition to 10 CSR 20-7.031, Missouri's Water Quality Standards rule. Modifications will be incorporated into Missouri's Water Quality Standards through the triennial review process. All modifications approved by the Clean Water Commission will receive official comment from EPA Region VII to ensure federal agreement with the recommendations.

10. Nature of Guidelines

These guidelines are not intended as a substitute for the professional judgement of staff members. These guidelines are intended to promote consistency in evaluating waters throughout the state, and to put the public on notice of the procedures generally employed by staff members in evaluating waters of the state. These guidelines only provide general guidance regarding the approach that the staff will take in developing recommendations, and the staff will make its recommendations on a case by case basis considering any and all relevant factors and procedures. In addition, this document is merely a reflection of the staff's procedures and is not intended to impact any commission rulemaking.

Appendix A

Flow Gauging Stations In and Near Missouri With At Least 30 Years of Flow Record

Station No.	Station Name	Latitude	Longitude
5495000	Fox River at Wayland, MO	402333	913550
5496000	Wyaconda River above Canton, MO	400832	913355
5497000	North Fabius River at Monticello, MO	400630	914251
5498000	Middle Fabius River near Monticello, MO	400537	914408
5500000	South Fabius River near Taylor, MO	395349	913449
5501000	North River at Palmyra, MO	394906	913113
5502000	Bear Creek at Hannibal, MO	394043	912433
5503500	SALT RIVER NEAR HUNNEWELL, MO	394010	915415
5504800	South Fork Salt River above Santa Fe, MO	391934	915002
5505000	SOUTH FORK SALT RIVER AT SANTA FE, MO	392145	914905
5506000	YOUNGS CREEK NEAR MEXICO, MO	391840	915640
5506500	MIDDLE FORK SALT RIVER AT PARIS, MO	392901	920049
5506800	Elk Fork Salt River near Madison, MO	392605	921004
5507000	ELK FORK SALT RIVER NEAR PARIS, MO	392625	920005
5507500	SALT RIVER NEAR MONROE CITY, MO	393225	914020
5508000	Salt River near New London, MO	393644	912430
5514500	Cuivre River near Troy, MO	390059	905900
5587450	Mississippi River at Grafton, IL	385805	902542
5587500	MISSISSIPPI RIVER AT ALTON, IL	385306	901051
7010000	Mississippi River at St. Louis, MO	383744	901047
7010500	MARAMEC SPRING NEAR ST. JAMES, MO	375720	913157
7013000	Meramec River near Steelville, MO	375958	912139
7014500	Meramec River near Sullivan, MO	380930	910630
7019000	Meramec River near Eureka, MO	383020	903530
7015000	BOURBEUSE RIVER NEAR ST. JAMES MO	380200	913853
7015720	Bourbeuse River near High Gate, MO	380849	913450
7016500	Bourbeuse River at Union, MO	382645	905930
7017200	Big River at Irondale, MO	374948	904127
7018000	BIG RIVER NEAR DESOTO, MO	380720	904030
7018100	Big River near Richwoods, MO	380934	904222
7018500	Big River at Byrnesville, MO	382145	903905
7020500	Mississippi River at Chester, IL	375410	895110
7022000	Mississippi River at Thebes, IL	371300	892750
7021000	Castor River at Zalma, MO	370848	900432
7032000	Mississippi River at Memphis, TN		
7035000	Little St. Francis River at Fredericktown, MO	373333	901846
7037500	St. Francis River near Patterson, MO	371140	903012
7039500	St. Francis River at Wappapello, MO	365541	901555
7040000	St. Francis River at Fisk, MO	364650	901208
7041000	LITTLE RIVER DITCH 81 NEAR KENNETT, MO	361410	895858
7042000	LITTLE RIVER DITCH 1 NEAR KENNETT, MO	361409	895853
7042500	LITTLE RIVER DITCH 251 NEAR LILBOURN, MO.	363320	894012
7043000	CASTOR RIVER AT AQUILLA, MO	365708	895425
7043500	Little River Ditch no. 1 near Morehouse, MO	365003	894348
7044000	LITTLE RIVER DITCH 251 NEAR KENNETT, MO	361408	895845
7045000	LITTLE RIVER DITCH 66 NEAR KENNETT, MO	361409	895848
7045500	LITTLE RIVER DITCH 66A NEAR KENNETT, MO	361410	895845
7046000	LITTLE RIVER DITCH 259 NEAR KENNETT, MO	361408	895841
7077380	Cache River at Egypt, AR		
7077500	Cache River at Patterson, AR		

Station No.	Station Name	Latitude	Longitude
7077700	Bayou DeView at Morton, AR		
6806500	WEeping WATER CREEK AT UNION, NE		
6807000	Missouri River at Nebraska City, NE		
6807000	Missouri River at Nebraska City, NE		
6810000	Nishnabotna River above Hamburg, IA		
6813000	TARKIO RIVER AT FAIRFAX, MO	402020	952432
6817500	NODAWAY RIVER NEAR BURLINGTON JCT, MO	402642	950519
6818000	Missouri River at St. Joseph, MO	394512	945128
6820500	Platte River near Agency, MO	394119	944215
6821150	Little Platte River at Smithville, MO	392317	943444
6819500	One Hundred and Two River at Maryville, MO	402045	944956
6891000	KANSAS RIVER AT LECOMPTON, KS		
6891500	WAKARUSA RIVER NEAR LAWRENCE, KS		
6892000	STRANGER CREEK NEAR TONGANOXIE, KS		
6892350	KANSAS RIVER AT DESOTO, KS		
6892500	KANSAS RIVER AT BONNER SPRINGS, KS		
6897000	East Fork Big Creek near Bethany, MO	401750	940136
6897500	Grand River near Gallatin, MO	395537	935633
6899000	WELDON RIVER AT MILL GROVE, MO	401835	933538
6899500	Thompson River at Trenton, MO	400446	933839
6900000	MEDICINE CREEK NEAR GALT, MO	400745	932145
6901500	Locust Creek near Linneus, MO	395345	931410
6902000	Grand River near Sumner, MO	393825	931625
6903400	Chariton River near Chariton, IA		
6903700	South Fork Chariton River near Promise City, IA		
6903900	Chariton River near Rathbun, IA		
6904500	Chariton River at Novinger, MO	401405	924114
6905500	Chariton River near Prairie Hill, MO	393225	924723
6906000	Mussel Fork near Musselfork, MO	393126	925659
6906200	East Fork Little Chariton River near Macon, MO	394459	923103
6906300	East Fork Little Chariton River near Huntsville, MO	392718	923407
6915000	BIG BULL CREEK NEAR HILLSDALE, KS		
6916000	MARAIS DES CYGNES RIVER AT TRADING POST, KS		
6916500	BIG SUGAR CREEK AT FARLINVILLE, KS		
6916600	MARAIS DES CYGNES RIVER NEAR KS-MO STATE LINE, KS		
6917000	L OSAGE RIVER AT FULTON, KS		
6917380	MARMATON RIVER NEAR MARMATON, KS		
6917500	MARMATON RIVER NEAR FORT SCOTT, KS		
6918440	Sac River near Dadeville, MO	372635	934105
6918460	Turnback Creek above Greenfield, MO	372409	934806
6918740	Little Sac River near Morrisville, MO	372858	932907
6919000	Sac River near Stockton, MO	374151	934543
6919500	Cedar Creek near Pleasant View, MO	375003	935231
6921070	Pomme de Terre River near Polk, MO	374056	932212
6921200	Lindley Creek near Polk, MO	374502	931558
6921350	Pomme de Terre River near Hermitage, MO	375420	931945
6921500	POMME DE TERRE RIVER AT HERMITAGE, MO	375645	931835
6922000	SOUTH GRAND RIVER NEAR BROWNINGTON, MO	381549	934252
6922500	Osage River at Warsaw, MO	381440	932310
6923500	BENNETT SPRING AT BENNETT SPRINGS, MO	374303	925126
6924000	NIANGUA RIVER NEAR DECATURVILLE, MO	375618	925037
6926000	Osage River near Bagnell, MO	381129	923626
6926500	OSAGE RIVER NEAR ST. THOMAS, MO	382020	921334
6928000	Gasconade River near Hazelgreen, MO	374533	922706
6928500	GASCONADE RIVER NEAR WAYNESVILLE, MO	375220	921337
6930000	Big Piney River near Big Piney, MO	373956	920301
6932000	Little Piney Creek at Newburg, MO	375435	915412

Station No.	Station Name	Latitude	Longitude
6933500	Gasconade River at Jerome, MO	375547	915838
6934000	Gasconade River near Rich Fountain, MO	382320	914915
6893000	Missouri River at Kansas City, MO	390643	943516
6893300	INDIAN CREEK AT OVERLAND PARK, KS	385630	944010
6893500	Blue River at Kansas City, MO	385726	943331
6893560	Brush Creek at Kansas City, MO	390222.7	943504.01
6893793	L. Blue River below Longview Dam at Kansas City, MO	385526	942805
6894000	Little Blue River near Lake City, MO	390602	941801
6895500	Missouri River at Waverly, MO	391254	933054
6909000	Missouri River at Boonville, MO	385842	924513
6910750	Moreau River near Jefferson City, MO	383144	921131
6907000	LAMINE RIVER AT CLIFTON CITY, MO	384526	930120
6908000	Blackwater River at Blue Lick, MO	385932	931148
6934500	Missouri River at Hermann, MO	384236	912621
7048000	WEST FORK WHITE RIVER AT GREENLAND, AR		
7048600	White River near Fayetteville, AR		
7049000	War Eagle Creek near Hindsville, AR		
7050000	WHITE RIVER AT BEAVER, AR		
7050500	Kings River near Berryville, AR		
7050700	James River near Springfield, MO	370900	931212
7052000	Wilson Creek at Scenic Drive in Springfield, MO	371112	931952
7052100	Wilson Creek near Springfield, MO	371006	932214
7052160	Wilson Creek near Battlefield, MO	370704	932414
7052250	James River near Boaz, MO	370025	932150
7052500	James River at Galena, MO	364819	932741
7053500	WHITE RIVER NEAR BRANSON, MO	363551	931742
7057500	North Fork River near Tecumseh, MO	363722	921453
7058000	Bryant Creek near Tecumseh, MO	363733	921816
7061300	EAST FORK BLACK RIVER AT LESTERVILLE, MO	372703	904938
7061500	Black River near Annapolis, MO	372010	904719
7062500	BLACK RIVER AT LEEPER, MO	370332	904112
7063000	Black River at Poplar Bluff, MO	364534	902317
7065000	ROUND SPRING AT ROUND SPRING, MO	371657	912427
7065500	ALLEY SPRING AT ALLEY, MO	370914	912629
7066000	Jacks Fork at Eminence, MO	370918	912131
7066500	CURRENT RIVER NEAR EMINENCE, MO	371102	911530
7067000	Current River at Van Buren, MO	365929	910053
7067500	BIG SPRING NEAR VAN BUREN, MO	365705	905936
7068000	Current River at Doniphan, MO	363719	905051
7069000	Black River at Pocahontas, AR		
7072500	Black River at Black Rock, AR		
7069500	Spring River at Imboden, AR		
7071000	GREER SPRING AT GREER, MO	364711	912053
7071500	Eleven Point River near Bardley, MO	363855	911203
7185000	Neosho River near Commerce, OK		
7186000	Spring River near Waco, MO	371444	943358
7187000	Shoal Creek above Joplin, MO	370123	943058
7189000	Elk River near Tiff City, MO	363753	943512

Appendix B

Macroinvertebrate Sampling Methods

Collection and Preservation of Samples

Equipment Needed:

- Bottom Aquatic Kick Net with 500 micron mesh net
- Nitex bag with 500 micron mesh net
- Large white pan
- 70% alcohol
- Labels
- Forceps
- Sample jars

For the purpose of this document Missouri has two stream types:

- 1) Streams with riffle/pool predominance are primarily found in the Ozark aquatic region of Missouri, but are also found in some portions of the Prairie region (Missouri Resource Assessment Partnership, 2000). A typical and characteristic feature of a riffle/pool stream type is a repeated and regular frequency of riffles. Riffles typically form every 7-10 stream widths. The three predominant habitats sampled for riffle/pool streams are: a) flowing water over coarse substrate; b) non-flowing water over depositional substrate; and c) rootmat substrate.
- 2) Streams with glide/pool predominance are found in the Prairie and Mississippi Alluvial Plains aquatic regions of Missouri (Missouri Resource Assessment Partnership, 2000). Glide/pool stream types generally have a repeated and predictable meander sequence. Pools typically form immediately after a bend. The three predominant habitats sampled for glide/pool streams are: a) non-flowing water over depositional substrate; b) large woody debris substrate; and c) rootmat substrate.

Representative organisms (Appendix C: Tables C-1, C-2, and C-3) from each major habitat are collected, preserved, and recorded separately to provide the ability to factor out habitat differences between sites. This will enhance comparisons involving streams where major habitats may be missing. As each habitat sample is collected and voucher organisms are preserved, a label is inserted in the sample jar stating the sampling location, date and habitat. Samples are preserved with 70% alcohol. An external sample label with sample identification number and habitat should also be placed on the sample jar.

Sampling Riffle/Pool Predominant Streams

Flowing water coarse substrate samples are not collected in streams that are pooled.

Non-flowing water depositional substrate samples are taken from depositional areas, formed when water current drops to low velocities, resulting in deposits of sediment and particulate organic matter that are no longer held in suspension. Because water velocities in these areas are not usually discernable with the naked eye, the water is categorized as non-flowing. Six collections from a variety of depositional depths and microhabitats (i.e., backwater, nearshore, forewaters, in channel pools, etc.) are collected with a bottom aquatic kick net with a 500 x 500 micron mesh bag. Each sample is taken from an approximately one-square meter area of substrate using a traveling kick method. To do this, the substrate is disturbed by the collector's feet to a depth of 15-25 cm while sweeping the net back and forth immediately over the substrate to collect organisms that are suspended in the water column. Each net sample should be examined for voucher organisms, which are then picked up with forceps and preserved in a labeled sample vial.

Rootmat substrate samples are submerged roots from terrestrial vegetation, which are important habitat and sources of refuge for aquatic organisms. Rootmat is best defined as the immersed portion of fine fibrous roots of woody vegetation that are found along the bank. Depending on the amount of rootmat present collections are made from six distinctly different areas along the sampling reach. Each collection is made from approximately one meter of shoreline exhibiting good quality rootmat. Sampling is accomplished by using a bottom aquatic kick net with a 500 x 500 micron mesh bag. If current is present, the net is placed so that the substrate can be disturbed by a kicking action which causes the organisms to be swept into the net. If no current is present, the net is placed under the substrate and shaken vigorously, causing any clinging organisms to fall into the net. Each net sample should be examined for voucher organisms, which are then picked up with forceps and preserved in a labeled sample vial.

Sampling Glide/Pool Predominant Streams

Non-flowing water depositional substrate samples are taken from depositional areas, formed when water current drops to low velocities, resulting in deposits of sediment and particulate organic matter that are no longer held in suspension. Because water velocities in these areas are not usually discernable with the naked eye, the water is categorized as non-flowing. Six collections from a variety of depositional depths and microhabitats (i.e., backwater, nearshore, forewaters, in channel pools, etc.) are collected with a bottom aquatic kick net with a 500 x 500 micron mesh bag. Each sample is taken from an approximately one-square meter area of substrate using a traveling kick method. To do this, the substrate is disturbed by the collector's feet to a depth of 15-25 cm while sweeping the net back and forth immediately over the substrate to collect organisms that are suspended in the water column. Each net sample should be examined for voucher organisms, which are then picked up with forceps and preserved in a labeled sample vial.

Large woody debris substrates are submerged portions of large logs as well as tree branches greater than one inch in diameter. A composite of twelve collections is made from different pieces of woody debris. The pieces of woody debris selected should represent a variety of conditioned wood types, sizes, water depths and velocities. The sampling area on each piece of woody debris is an area of approximately 400-600 square centimeters. Organisms associated with the large woody debris and associated growths of periphyton or moss are collected by using a hand scrub brush and a nitex bag with dimensions of 44 centimeters wide by 50 centimeters deep. The bag is made by folding a 46 centimeters wide by 102 centimeter long piece of 500 x 500 micron mesh nitex cloth in half. The sides are folded over 10 centimeters and sewn together. Each edge at the top is also folded and sewn for extra strength. The sampling of woody debris usually requires two people. When possible large woody debris is gently lifted off the stream bottom and slid into the bag by one individual while the other individual holds the bag open. The wood and bag can then be tilted to vertical after which the first individual holds and brushes the wood while the second individual continues to hold the bag open. Woody debris too large to lift can be sampled using different strategies depending upon water velocity. Both strategies require one individual to hold the bag opening open while molding one side of the bag to fit the contour of the wood. If water current is present the bag is placed immediately downstream from the sampling area and the current carries organisms into the bag. When there is no natural current available, an artificial current can be created by repeatedly sweeping the brush along the log only in the direction of the bag opening. When the twelve collections have been made the sample is processed by concentrating the material into one corner of the bag by splashing the outside of the bag with water. The corner of the bag and concentrated material can then be grasped and inverted into a pan to look for voucher organisms, which are then picked up with forceps and preserved in a labeled sample vial.

Rootmat substrate samples are submerged roots from terrestrial vegetation, which are important habitat and sources of refuge for aquatic organisms. Rootmat is best defined as the immersed portion of fine fibrous roots of woody vegetation that are found along the bank. Depending on the amount of rootmat present collections are made from six distinctly different areas along the sampling reach. Each collection is made from approximately one meter of shoreline exhibiting good quality rootmat. Sampling is accomplished by using a bottom aquatic kick net with a 500 x 500 micron mesh bag. If current is present, the net is placed so that the substrate can be disturbed by a kicking action which causes the organisms to be swept into the net. If no current is present, the net is placed under the substrate and shaken vigorously, causing any clinging organisms to fall into the net. Each net sample should be examined for voucher organisms, which are then picked up with forceps and preserved in a labeled sample vial.

Appendix C

Macroinvertebrate Indicators of Class C streams

At the request of the Water Pollution Control Program, the Environmental Services Program, Water Quality Monitoring Section, Aquatic Bioassessment Unit has developed a list of macroinvertebrate taxa and criteria for Class C streams of Missouri Prairie and Ozark ecoregions. The purpose of the taxa list and criteria are to better evaluate any currently unclassified streams in Missouri as to their potential for classification as Class C in the Missouri Water Quality Standards. This memorandum provides the methodology by which the expected Class C streams macroinvertebrate taxa list was developed.

The Aquatic Bioassessment Unit (ABU) database currently consists of 760,083 identified macroinvertebrate taxa from 708 stream stations in 75 Missouri counties. The dates of record are from September 1994 through April 2003. Each of the stream stations has descriptive information, including the stream class designations for Class P (permanent flow), Class C (maintains permanent pools in times of dry weather), and streams that are designated by the ABU as Class U (unclassified streams).

The life cycles and ecology of many macroinvertebrates are not completely known, therefore it is difficult to determine from published literature which stream macroinvertebrate taxa in Missouri require permanent flow or permanent pools. The first step in the process to determine which taxa could be expected to require permanent pools was to query macroinvertebrate information from the ABU database based upon Class C and Class P parameters. In addition, the data was sorted by three geographical and stream type criteria and was filtered by fall data only. This allows a better prediction of macroinvertebrate taxa at any potential Class C stream location during the time period that is designated for Class C determinations. The three categories are Prairie – glide/pool streams (P-GP), Prairie – riffle/pool streams (P-RP), and Ozark – riffle/pool (O-RP) streams. The number of Class C and Class P streams used in each category were P-GP=25 Class C and 40 Class P, P-RP=21 Class C and 18 Class P, and O-RP=13 Class C and 170 Class P. In addition, only macroinvertebrate taxa from pool related habitats were included in the query. For GP streams this includes all potential habitats (depositional, large woody debris, and rootmat) as listed in the Semi-quantitative Macroinvertebrate Stream Bioassessment Project Procedure (MDNR 2003). For RP streams only depositional and rootmat habitats were included because Class C streams that are evaluated during drought will most likely be pooled and will not have the third potential habitat of flowing water over coarse substrate (MDNR 2003). From the list of all taxa that was generated for the three categories, only taxa that were present at both Class C and Class P streams were selected as candidates. These lists of candidates are taxa that are found in permanent streams of Missouri. The taxonomic level of identification is the lowest practical level that is listed in the Taxonomic Levels for Macroinvertebrate Identification Standard Operating Procedure (MDNR 2001).

The next series of steps was designed to narrow the list of candidate taxa that are found in permanent streams to a list of taxa that require permanent streams. The reason for this distinction is the fact that taxa adapted to a life cycle that can withstand total drying of the stream are also found in permanent streams. Other taxa found in permanent streams are limited to streams that have permanent water. Although the literature concerning this topic is not extensive there are several good sources of information that deal with macroinvertebrate taxa that require permanent water in streams. Rabeni and Wallace (1998) provide information about macroinvertebrate taxa from 15 sites in the Ozarks that range from permanent to intermittent. Ohio (OEPA 2002) has done considerable work on the prediction of macroinvertebrate taxa in headwater streams. Wiggins et al. (1980) provides valuable information concerning the ability and strategies of specific invertebrates in surviving complete drying of semi-permanent waters.

The first step was to select taxa from the Missouri candidate list reported to be taxa that require permanent streams or streams with permanent pools (Rabeni and Wallace, 1998; OEPA, 2002). Because neither document was considered all-inclusive for Missouri, the final step was the use of best professional judgement by three aquatic biologists in the ABU. Additional taxa were selected from the candidate list based upon ecological information or aquatic life stages that were one year or longer. A selection of the final macroinvertebrate taxa list of Class C Missouri streams can be found in the tables below for P-G/P, for P-R/P, and for O-R/P. The expected number of Class C taxa are P-GP=23 taxa, P-RP=29 taxa, and O-RP=30 taxa.

Because the Class C expected taxa list is a composite of information from many streams, the next step determines the criteria that any one Class C stream could pass. To determine this criteria, existing Class C streams within the appropriate category were queried for the number of expected taxa actually present during past MDNR sampling. In order to have sufficient data, all streams were included, including streams that have varying degrees of anthropogenic impacts. The highest value reached by any stream in its respective category was an observed /expected ratio of 12/23 taxa or 52% for the category P-GP, 15/29 taxa or 52% for the category P-RP, and 16/30 taxa or 53% for the category O-RP. Assuming all Class C streams used in the calculation are accurately classified the numeric criterion for each category becomes the lowest value for each category. Those value are P-GP=2 taxa, P-RP=3 taxa, and O-RP=4 taxa.

As mentioned above, the criterion was calculated with varying degrees of human influence. Streams that fall into the lower 25th percentile of the Class C stream criteria may have natural or human influenced limitations for aquatic fauna. Any values less than the 25th percentile could function as an action level at which a candidate Class C stream receives further evaluation to determine if the community is unduly influenced by anthropogenic activities such as poor water quality or poor habitat, which could be directly responsible for the low value. The 25th percentile values for candidate Class C streams are P-GP=5 or 22%, P-RP=8 or 28%, and O-RP=8 or 27%.

These macroinvertebrate criteria used in combination with the presence of fish, mussels, and/or aquatic plants could provide a more definitive way of determining if a candidate Class C stream supports aquatic life that requires permanent pools.

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Table C.1. Class C Macroinvertebrate Taxa
Prairie – glide/pool streams

	Taxa-Code	Taxa	Class C	Class P	Ohio-Class II	Rabeni	MDNR BPJ
Coleoptera	6810	Dubiraphia	X	X		X	X
Coleoptera	6890	Stenelmis	X	X		X	X
Crustacea	511	Hyalella azteca	X	X	X	X	X
Crustacea	757	Orconectes luteus	X	X			X
Crustacea	773	Orconectes virilis	X	X			X
Crustacea	651	Palaemonetes kadiakensis	X	X			X
Ephemeroptera	1471	Baetisca lacustris	X	X			X
Ephemeroptera	1128	Isonychia rufa	X	X			X
Ephemeroptera	1269	Stenonema terminatum	X	X			X
Ephemeroptera	1390	Tricorythodes	X	X		X	X
Ephemeroptera	1650	Hexagenia	X	X			X
Megaloptera	7510	Sialis	X	X			X
Megaloptera	7560	Corydalus	X	X			X
Odonata	2010	Calopteryx	X	X			X
Odonata	2020	Hetaerina	X	X			X
Odonata	2353	Boyeria	X	X			X
Odonata	2160	Enallagma	X	X		X	X
Odonata	2361	Nasiaeschna pentacantha	X	X			X
Odonata	2460	Gomphus	X	X			X
Odonata	2660	Macromia	X	X			X
Odonata	2730	Somatochlora	X	X	X		X
Trichoptera	5130	Cheumatopsyche	X	X		X	X
Trichoptera	5160	Hydropsyche	X	X			X
Total		23					

Table C.2. Class C Macroinvertebrate Taxa
Prairie – riffle/pool streams

	Taxa-Code	Taxa	Class C	Class P	Ohio-Class II	Rabeni	MDNR BPJ
Coleoptera	6810	Dubiraphia	X	X		X	X
Coleoptera	6851	Macronychus glabratus	X	X			X
Coleoptera	6721	Psephenus herricki	X	X			X
Coleoptera	6890	Stenelmis	X	X		X	X
Crustacea	511	Hyalella azteca	X	X	X	X	X
Crustacea	757	Orconectes luteus	X	X			X
Crustacea	773	Orconectes virilis	X	X			X
Crustacea	651	Palaemonetes kadiakensis	X	X			X
Ephemeroptera	1120	Isonychia	X	X			X
Ephemeroptera	1128	Isonychia rufa	X	X			X
Ephemeroptera	1269	Stenonema terminatum	X	X			X
Ephemeroptera	1390	Tricorythodes	X	X		X	X
Ephemeroptera	1650	Hexagenia	X	X			X
Megaloptera	7510	Sialis	X	X			X
Megaloptera	7560	Corydalus	X	X			X
Odonata	2010	Calopteryx	X	X			X
Odonata	2020	Hetaerina	X	X			X
Odonata	2160	Enallagma	X	X		X	X
Odonata	2351	Basiaeschna janata	X	X			X
Odonata	2353	Boyeria	X	X			X
Odonata	2361	Nasiaeschna pentacantha	X	X			X
Odonata	2460	Gomphus	X	X			X
Odonata	2660	Macromia	X	X			X
Odonata	2730	Somatochlora	X	X	X		X
Trichoptera	5130	Cheumatopsyche	X	X		X	X
Trichoptera	5030	Chimarra	X	X		X	X
Trichoptera	5860	Helicopsyche	X	X		X	X
Trichoptera	5160	Hydropsyche	X	X			X
Trichoptera	5660	Pycnopsyche	X	X			X
Total		29					

Table C.3. Class C Macroinvertebrate Taxa
Ozark – riffle/pool streams

	Taxa-Code	Taxa	Class C	Class P	Ohio-Class II	Rabeni	MDNR BPJ
Coleoptera	6810	Dubiraphia	X	X		X	X
Coleoptera	6726	Ectopria nervosa	X	X			X
Coleoptera	6851	Macronychus glabratus	X	X			X
Coleoptera	6860	Microcylloepus pusillus	X	X			X
Coleoptera	6721	Psephenus herricki	X	X			X
Coleoptera	6890	Stenelmis	X	X		X	X
Crustacea	511	Hyalella azteca	X	X	X	X	X
Crustacea	757	Orconectes luteus	X	X			X
Crustacea	760	Orconectes medius	X	X			X
Crustacea	773	Orconectes virilis	X	X			X
Ephemeroptera	1340	Eurylophella	X	X			X
Ephemeroptera	1268	Stenonema pulchellum	X	X		X	X
Ephemeroptera	1390	Tricorythodes	X	X		X	X
Ephemeroptera	1650	Hexagenia	X	X			X
Megaloptera	7510	Sialis	X	X			X
Odonata	2010	Calopteryx	X	X			X
Odonata	2160	Enallagma	X	X		X	X
Odonata	2351	Basiaeschna janata	X	X			X
Odonata	2353	Boyeria	X	X			X
Odonata	2361	Nasiaeschna pentacantha	X	X			X
Odonata	2460	Gomphus	X	X			X
Odonata	2491	Hagenius brevistylus	X	X			X
Odonata	2660	Macromia	X	X			X
Odonata	2730	Somatochlora	X	X	X		X
Odonata	2551	Stylogomphus albistylus	X	X			X
Plecoptera	3510	Acroneuria	X	X	X	X	X
Trichoptera	5130	Cheumatopsyche	X	X		X	X
Trichoptera	5030	Chimarra	X	X		X	X
Trichoptera	5860	Helicopsyche	X	X		X	X
Trichoptera	5160	Hydropsyche	X	X			X
Total		30					

Appendix D

Additional Information Pertaining to Effluent Dominated Streams

The Federal Water Pollution Control Act appears to support the concept of designation of effluent dominated waters as classified waters.

§131.10 (d) At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306 of the Act and cost-effective and reasonable best management practices for nonpoint source control.

§131.10(g) States may remove a designated use which is not an existing use, as defined in §131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:...

*(2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, **unless** these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met.*

In the Federal Register, July 7, 1998 (Volume 63, No. 129) USEPA, under some proposed revisions to their Water Quality Standards Regulation, they clarify their position on §131.10(g) with the following language on page 36755:

“EPA’s interpretation of this phrase is that, where an effluent discharge creates an essentially perennial flow for what naturally would be ephemeral or intermittent waters, the resulting aquatic community is to be protected. EPA’s current thinking is that in situations such as these, the second criterion (131.10(g)(2)) for use removal means that a State or Tribe cannot remove a use of a water body where the augmented flow supports an aquatic life use.”

While this guidance does not speak directly to classification of previously unclassified waters, it does convey EPA’s opinion that where effluent dominated waters can support beneficial uses, the fact that the stream is effluent dominated is not sufficient reason to ignore any potential beneficial uses of that stream.

Appendix E

Information Provided by the Department of Natural Resources, Geological Survey and Resource Assessment Division

Do people have floating access to Missouri Streams?

There is no state statutory right to access streams or lakes. The federal interstate commerce law has been interpreted by Missouri courts to allow public use of navigable streams.

Missouri case law says that one's right to float on a stream does not allow one to trespass on private property. Access to a stream must be from public property or with permission from the landowner. In Missouri on navigable streams, the landowner generally owns to the low water edge.

The U. S. Army, Corps of Engineers, has their basis of determining navigable streams, and local counties have also made their own interpretation. Missouri trespass laws can be severe, so asking permission of a landowner to enter the property is always required and maybe for streams that are only floatable during high flows. The Department of Natural Resources has published "A Summary of Missouri Water Laws," a state water plan publication that addresses this question.

Appendix F

Solicitation of Comments on Draft Stream Classification Evaluation Procedures

Between October 20 and October 22, a draft copy of these guidelines was e-mailed to the following individuals: Aaron Miller, Doe Run Co.; Barry Poulton, USGS, Biological Resources Division; Caitlyn Peel, Home Builders Association of Greater St. Louis; Charles Kruse, MO Farm Bureau; Charles Rabeni, University of Missouri, Columbia; Charlie Scott, USFWS; Chris Vitello, MDC; Cindy DiStefano MDC; Dennis Stinson, DNR/LRP; Dick Champion, City of Independence; Frank Pogge, City of Kansas City; Harold Kerns, MDC; Harold McCoy, City of Joplin; Jerri Davis, USGS-WRD; John Buckwalter, City of Kirksville; John Havel, SMSU; John Lodderhose, MSD; John Pozzo, AmerenUE; John Witherspoon, City Utilities of Springfield; Kevin Perry, RegForm; Ken Maki, City of Lake St. Louis; Ken Midkiff, Sierra Club; Larry Ferguson, USEPA Region VII; Leanna Zweig, MDC; Leslie Holloway, MO Farm Bureau; Loring Bullard, Watershed Committee of the Ozarks; Matt Winston, MDC; Mimi Garstang, DNR/GSRAD; Paul Andre, MO Department of Agriculture; Ralph Schlemper, Friends of Kit Creek; Rex Martin, Syngenta Crop Science Corp; Robert Brundage, Mo Ag Industries Council; Ron Dent, MDC; Royan Teter, USEPA Region VII; Sarah Fast, DNR/SWCP; Stuart Miller, DNR/LRP; Ted Heisel, MO Coalition for the Environment; Terry Timmons and William Price, DNR/PDWP; Robert Hentges, MO Public Utility Alliance; Trent Stober, MEC; Liz Grove, Clarence Cannon Wholesale Water Commission; Steve Propst, Lake St. Louis Community Association; Bob Ball, USDA-NRCS. The e-mail was also sent to the DNR Regional Office directors.

On October 21, a copy of the draft guidelines was distributed to these attendees of the Water Quality Coordinating Committee: Jeanette Schaefer, USEPA, Angel Kruzen, Water Sentinel/Sierra Club, Bob Broz, UMC, Richard Gaskin, City of Kansas City, Bart Hawcroft, MO Department of Agriculture.

On January 29, 2004 the draft guidelines were placed on a 30 day public notice. The guidelines were presented to the Clean Water Commission at the August 4, 2004 meeting. At this meeting the Commission directed staff address public comments made at this meeting.

Stakeholder Review: Stakeholder Comments and DNR Responses.

1. Ken Midkiff, Sierra Club, October 22, 2003

1. According to standards established by various federal agencies, any waterbody over six (6) acres is considered a “lake” and therefore are “waters of the United States.” There are exceptions to this: Montana defines a “lake” as any natural body of water containing more than 20 acres; Minnesota on the other hand defines almost every contained body of water as a “lake.” In any event, it is unnecessary to provide the other “guidelines” which contradict this standard; if a lake is considered to be “waters of the United States,” it is required to be a classified waterbody. To place a size limit of more than 1500 acres is arbitrary, capricious, unreasonable, and violates federal laws and regulations (see #2 below).

2. It should be noted that 33 CFR 328.3 (copy below) defines “waters of the United States” pertaining to jurisdictional waters of the U.S. Army Corps of Engineers, and as such must provide the basis for all decisions by MoDNR; water quality certification (Sec. 401) decisions must be provided by MoDNR for all activities that require a permit under Sec. 404 and therefore ALL “waters of the United States” must be classified and have “beneficial uses” designated. These uses must comply with Section 101 of the Clean Water Act - and at a bare minimum must be fishable and swimmable.
3. While the classification of a “lake or reservoir” applies to both public and private waters, in order to avoid confusion by private property owners (such as the joint ownership of a private lake as part of the “commons” of a subdivision), the language of the current 10 CSR 20-7.031(1)(F) should be retained.
4. The section on wetlands seems appropriate, since it is based on federal guidelines.
5. It is my understanding that the USGS is recalculating its historic hydrograph, since there is some concern that the base period may not be reflective of the true historic record. Until this re-evaluation is completed, it is suggested that the current language regarding a “drought or dry period” remain as is.
6. There appears to be a contradiction regarding the classification of Class C streams in Section 6 and Section 8. This needs to be resolved.
- 7.a. In Section 7, how was the “70%” visible surface flow determined?
- 7.b. While there is a discussion regarding surficial and sub-surficial flows in Section 7, it should be noted that there are many Ozark area streams on which there are NO surficial flows as the impermeable bedrock does not extend to the surface in riffle areas. If there were not some type of flow, there would be no pools, as evaporation or evapo-transpiration would quickly deplete these pools – particularly in periods of drought where the humidity level is low and evaporation rates are high. This is a serious flaw and will be aggressively opposed.
- 8.a. How can a determination be made if access is denied? There needs to be added a discussion of this issue. It is suggested that most, if not all, waterbodies have public access (low water bridges, road right-of-ways) where assessments could be made. As an alternative, if access is denied, then a de facto classification would be made.
- 8.b. In Section 8, there is no basis for the “1 foot” in depth requirement. There are many Ozark streams that maintain permanent pools, with subsurface flow, where the pools are less than 1 foot in depth. We strongly advocate requiring NO depth, but only the existence of permanent pools sufficient to support aquatic life as in Guideline 8.1.2.
- 8.c. In section 8.2, it could well be that water contaminants are present which lower the dissolved oxygen level or which cause acute or chronic effects detrimental to aquatic life. While we have no great objection to the criteria outlined in 8.2, there should be added an assessment of the presence of water contaminants. If contaminants are present which would be detrimental to aquatic life, the waterbody should be classified and immediately placed on the “impaired waterbody” (303(d)) list.
9. This entire section is extremely objectionable as the request for classification change is to be accompanied by “documentation.” The objection is that certain individuals, industries, and other entities have the wherewithal to contract with consulting firms that could easily prepare such documentation, whereas an impacted citizen would not have such resources. While we can agree that there must be some reason or basis for the change, and while it is noted that the “documentation” will be reviewed for “accuracy, completeness, and adequacy” by MoDNR or other partnering agency, we

- do not believe that this presents an equitable nor fair system for classification or changes to classifications. Those with wealth have an unfair advantage. For example, it can easily be seen that it would be to the advantage of a municipal wastewater utility to request and document a change from a “classified” to an “unclassified” receiving waterbody – while downstream citizens would have little recourse. What looks like sewage downstream is perceived as a lessening of the regulatory burden upstream. All of this could be easily resolved by a requirement that an on-site assessment be made by MoDNR personnel and that any objection to a change in classification requires a public hearing by the Clean Water Commission.
10. GENERAL COMMENTS. It is worth noting that classification was not an issue until there was a request to classify a waterbody into which Premium Standard Farms may place pollutants, and involved proposed placement on the impaired waterbody list of unclassified streams (even though every waterbody is to meet certain standards as enumerated in Section 101 of the federal Clean Water Act). It is strongly suspected that this entire request springs from tainted motives of members of the Clean Water Commission; therefore, we will view this process with a high degree of skepticism.

DNR Response:

Ken, thanks for your prompt and thorough reply. While a copy of this email will serve as documentation of your comments and DNR’s response, please note that we plan to present these guidelines, as amended, after consideration of public comment, to the Clean Water Commission, probably in January or February and you would have that opportunity to reiterate your comments at that time. I’d like to address a few of your comments.

1. Minimum lake size: I believe you may have misread this section. There is no minimum lake size. Any lake over 1500 acres is proposed as an L2. Lakes less than that size would be either an L1 or an L3 lake depending on whether or not it was used as a public drinking water supply source.
2. Is this comment directed at some specific part of our guidelines?
3. The current wording between the water quality standards and the effluent guidelines is inconsistent and confusing. We believe this change will eliminate rather than create confusion.
4. We agree.
5. I don’t understand this comment. There is no present language defining what a “dry period” is. The proposed guidelines suggest use of readily available statistics for weather and streamflow. I am not aware of any “recalculations” by USGS that would affect the use of these streamflow statistics.
6. I just reread these two sections and I don’t believe there is any inconsistency. Section 6 notes the TOTAL number of pools that must be evaluated for each candidate segment. Section 8.1. gives numbers for pools OF A PARTICULAR SIZE needed to meet the guideline.
- 7.a. The 70% figure was a best professional judgement by two experienced aquatic biologists in our laboratory.
- 7.b. I don’t understand your concern. Is it your contention that streams with subsurface flows and only occasional surface pools of water should be Class P streams? How could this be documented easily and inexpensively in the field? These streams would receive the same protection under our water quality standards as Class C streams as if

they were Class P, unless site specific information determined them to be “limited warm water fisheries.”

8. This is an excellent point. We are concerned about this as well but don't see an obvious way of dealing with it.
9. Since the process may result in changes to state rules, we feel adequate documentation that a change is warranted is an absolute necessity. We have designed the process so that a person with Level 2 Volunteer Water Quality Monitoring training could conduct this survey. At present there are over 220 such people in the state and we are training 15-20 more each year. I am sure that many of these Level 2 volunteers would be willing to do this type of work so all that is needed is to hook up the people wanting a stream investigated with those who can do it. These folks already have the equipment so all it costs is their time.
10. This statement does not pertain to the content of the guidelines, so no response is given.

2. Ken Midkiff, Sierra Club, October 23, 2003

After re-reading the draft (as per comments on #1), you are correct - I did misread this as it pertains to lakes, and therefore, withdraw my comments on this issue.

As to USGS recalculations, I will readily admit that this is a rumor (but with a high degree of reliability). According to more than one “source,” USGS is doing this because of the floods of '93 and '95. Apparently, two “100 year” floods within two years convinced them that some of their data may have been faulty. You might check with the water resources folks in USGS about this - I don't know that this is public knowledge, so they may deny everything (under the guise of Homeland Security).

I will reaffirm other comments, but wish to address #9 in more detail:

If “documentation” could be defined to include water sampling and assessment by Level 2 (or above) volunteers, then that would relieve my concerns considerably. As it is now written, however, it presents a very high stack of documents with no indication of acceptability. While I realize that biological samples for Level 2 volunteers was recognized in Section 8, this language needs to be included in Section 9 - since data from volunteers appears to be unacceptable.

My major concern, however, is that MoDNR staffers should do on-site assessments NO MATTER WHO has made the request. The request, therefore, should contain only enough information to justify the assessment. In short, I would prefer to see MoDNR staff doing the assessment, based on reasonable documentation. The amount of documentation required by the draft is daunting.

DNR Response:

Ken, with regard to Section 9, there is no language that would exclude documentation by Level 2 or higher volunteers and this section is there only to summarize what needs to be submitted and where to send it. We have purposefully tried to not exclude participation in this process by people with little or no training but who could make careful and accurate measurements. Thus, if you reread the guidelines you will find there are no restrictions on

who can submit documentation on Sections 3, 5, 6 and 7. Section 8 is proposed to be restricted to those with Level 2 volunteer monitoring training or commensurate training or experience. In Section 4, we have not yet decided who can provide this documentation and in the guideline document, ask this question of commenters.

DNR would like to do a follow up on all candidate waters to assure accuracy but due to our work load, this appears to be unlikely if more than a few streams are proposed each year.

3. Robert Hentges, Missouri Public Utility Alliance October 28, 2003

I have been through your proposed guidelines for determining classifications once. I think there needs to be a definition of what was used to make the original stream classifications. If I remember correctly, the first cut of the WQS used the work done by the CCC during the drought in the early 30's. The Department of Conservation had the original maps, drawn after the CCC walked all the stream to determine flowing, pools or dry stream beds. I think that data was published by the late John Funk. It was real time data on which streams maintained permanent flow or pools during a major drought.

By stating the original data for the classification, commenters will understand the base before requesting addition or deletions.

DNR Response:

We have a copy of this report. It is entitled "Missouri's Fishing Streams," DJ Series No. 5, by John Funk, published in 1968. It notes that the original data was compiled in the early 1940s based on field observations made during the drought in the 1930s. The report lists the names of streams and both the mileage that was considered permanently flowing stream and the mileage of pooled (but fishable) stream during drought conditions. The introduction of the report also notes that much of the work was re-visited in the 1950s and was found to generally confirm these earlier observations.

4. Hans P. Holmberg, P.E, Limno-Tech, Inc., October 28, 2003

Senior Project Engineer, 1326 Birch Park Ridge, Houlton, WI 54082

Phone: 715.549.6740; Fax: 715.549.6741 hholmberg@limno.com www.limno.com

I have completed a review of the draft Guidelines for Determination of Waterbody Classification on behalf of the Kansas City Water Services Department. We commend the DNR's efforts to clarify this process and appreciate the opportunity to review and comment on the draft guidelines. I have one comment for your consideration:

When assessing for permanently flowing streams, Class P, during "drought" or "dry period" conditions, consideration should be given to the source of "visible surface flow." For example, if the primary source of flow is from anthropogenic sources such as permitted discharges or irrigation runoff, the stream should not be classified as Class P. I suggest Guideline 7.1. be rewritten as:

"During the previously defined "drought" or "dry period," and in the absence of anthropogenic sources of flow, the stream segment evaluated must have visible surface flow for at least 70% of the segment length."

Other states and EPA have considered effluent contributions to stream flow and subcategories of classification have been established for effluent-dominated streams. Please feel free to contact me with any questions.

DNR Response:

Hans, thanks for the comment. As your email notes, effluent dominated streams cannot be ignored when classifying streams and applying water quality standards. Clearly at some future time, Missouri should look at development of a use classification that specifically applies to effluent dominated streams. However, for the present we have only the Class P and Class C designations and if a stream has permanent flow during a dry period, I see little recourse to identifying it as a Class P water. We do believe common sense should place some limitations on bestowing classified stream status on such streams. For instance should there be a minimum length of permanent flow below which the stream would not be classified? Should there be a minimum sized watershed below which the stream should not be classified? Should an effluent dominated stream segment that is a candidate for classification be directly connected to the existing classified stream network or can it be separated by an unclassified segment? If a separation is allowed, how long can this separation be? We would welcome further discussion on these questions to assist us with the immediate problem of determining classification of effluent dominated streams.

5. Dorris Bender, City of Independence, November 5, 2003

The City of Independence, Water Pollution Control Department (WPC), wishes to make the following comments regarding the Department of Natural Resources (DNR) proposed guidelines for determining the classification that a stream, lake or wetland should have under Missouri's Water Quality Standards.

Proposed Guidelines for Lake Classification

The draft guidelines recommend that all references to "public" or "private" lakes be deleted for the purposes of Missouri's Effluent Regulation and classification within Missouri's Water Quality Standards. We do not wish to comment on the merits of eliminating this distinction, which does not directly affect us at this time. However, we are concerned about what appears to be an attempt to amend the Effluent Regulation via a guidance document. We believe that the draft guidelines err in asserting that "Missouri's Effluent Regulation 10 CSR 20-7.015 does not distinguish between public and private L3 lakes with regard to effluent limits." The draft guidelines note that the Effluent Regulation at 10 CSR 20-7.015(3) prescribes effluent limits of 20 mg/l BOD and 20 mg/l NFR for "...a lake or reservoir designated in 10 CSR 20-7.031 as L2 or L3 which is publicly owned." The draft guidelines go on to state that, "In no other location within the Effluent Regulation are effluent limits given for other (private) lakes." This statement apparently overlooks the effluent limits prescribed for private lakes in 10 CSR 20-7.031(3)(E), which states that, "For lakes designated in 10 CSR 20-7.031 as L3 which are not publicly owned, the discharge limitations shall be those contained in section (8)." Section (8) contains effluent limitations for "All Waters, Except Those in Paragraphs (1)(A)1.-6" and prescribes monthly average BOD and NFR effluent limits of 30 mg/l. We do not dispute the statement in the guidelines that "The hydrology, water chemistry and response to pollutant discharges (are) the same in public and private lakes." However, there may be a difference between public and private lakes regarding public accessibility, which could be a factor in whole body contact designation

issues. In any event, if the Effluent Regulations are to be amended, this must be accomplished via the rulemaking process established in Missouri statutes. The Effluent Regulations cannot legally be amended by a guidance document.

DNR Response:

We did not overlook the reference to effluent limits for private lakes which appears in the water quality standards regulation. We simply stated that no reference to effluent limits for private lakes could be found in the effluent regulation. We agree that these guidelines could not legally supercede any portion of a state rule. The intent of this discussion on public and private lakes within these guidelines was to elicit comment on how DNR may amend the effluent regulation in the future.

City of Independence Comment:

Proposed Guidelines for Streams with Permanent Pools in Dry Weather that Support Aquatic Life, Class: We support DNR's proposal to require evidence of the presence of aquatic life that requires permanent pools for Class C candidate waters. "Aquatic life" is not defined in Missouri Clean Water regulations. Nevertheless, the definition of "beneficial water uses" in 10 CSR 20-7.031 Water Quality Standards gives a good sense of the intended meaning of "aquatic life" with respect to classified waters. The Table A Specific Criteria that apply to a classified water body depend upon the type of fishery the water body supports: cold-water fishery, cool-water fishery, warm-water fishery (including naturally reproducing populations of recreationally important fish species) or limited warm-water fishery. In other words, protection of aquatic life in classified waters relates primarily to fish. This is in keeping with the Clean Water Act national goal, wherever attainable, of "... water quality which provides for the protection and propagation of fish, shellfish, and wildlife. . . ." The presence of aquatic life on an intermittent basis would not justify listing a water body as classified. The Water Quality Standards General Criteria at 10 CSR 20-7.031(3) provide protection for "unclassified waters which support aquatic life on an intermittent basis."

DNR Response:

We generally agree with the caveat that we believe "fishery" implies not only fish but the physical and chemical properties of the water and other aquatic life that are important parts of the food web of this "fishery."

City of Independence Comment:

Classification of Effluent-Dependent Waters

A comment was made at the October 21 Water Quality Coordinating Committee meeting that the proposed guidelines could result in classification of effluent-dependent streams.

Consequently, facilities that discharge to effluent-dependent streams would be required to meet more stringent water quality based NPDES permit limits. This would be a significant policy change. We request that DNR give further consideration to this issue. The proposed guidelines should be amended to include an analysis of the potential consequences and provide possible alternative approaches, and an opportunity should be provided for public comment.

DNR Response:

There are several streams presently classified due solely to the presence of wastewater flows. However, there are probably many more that are not presently classified that might be,

depending on how the final guidelines address this issue. It would be impossible for DNR to do a meaningful analysis of the consequences of this guideline since each combination of wastewater discharge and its receiving stream and watershed are unique. We have insufficient information to predict which or how many of the wastewater discharges in the state might result in small receiving streams having permanent flow during our proposed “dry period.” However, DNR does believe the classification of effluent dominated streams is a very important issue and must be done with care and common sense. We encourage further public comment on how this should be done.

6. Leslie Holloway, Missouri Farm Bureau November 6, 2003

Thank you for the opportunity to comment on the proposed guidelines.

If I understand the proposal correctly, our concerns include the following:

Private lakes that are not currently subject to state water quality standards would be subject to these standards.

Lakes that are currently classified but are less than 15% full year round, three out of four years would be reclassified as wetlands.

Wetlands classification would be based on U.S. Army Corps of Engineers Wetlands Delineation Manual.

Biological monitoring data submitted by volunteers would be used to determine the classification of waterbodies.

It is unclear whether all of the macroinvertebrates listed in the three tables in Appendix C are proposed to be required to be present in classified streams. Also, it is unclear how these proposed criteria relate to proposed biocriteria water quality standards which I understood from previous discussions the department has held for public comment pending final internal review for several years.

Finally, why have separate reporting of “Human Disturbance” and “Signs of Livestock Use” on the Pool Survey Field Data Sheet?

Thanks again for the opportunity to comment. I would appreciate further clarification on the points I have identified.

DNR Response:

Leslie, thanks for your comments. First of all, these guidelines themselves will not result in any changes in our present water quality standards. Any change to the standards has to go through the state rulemaking process. Thus, these guidelines will not result in any waters being added, deleted or changed within our standards, but will be the yardstick DNR will use to propose future changes in classification in our standards.

With regard to the lake/wetlands criterion, the 15% wetted criterion need apply only one year in four, not three years in four. Biological monitoring data (hydric plants) is required as part

of the documentation for wetlands. Aquatic macroinvertebrate and/or fish data is required to document Class C status. No other classifications would require any biological data.

The requirements for invertebrates are in the third to the last paragraph in Appendix C on page 18. For Prairie Streams with a “Glide-Pool” structure, at least two taxa are required. For Prairie streams with a “riffle-pool” structure, at least three taxa, and for Ozark “riffle-pool” streams, at least four taxa. These are the minimum numbers of taxa our biologists have found in Class C streams of these respective types, so this would seem to be the appropriate level to set these criteria.

In the worksheet we have asked for separate information on indications of human use and livestock use of the stream primarily because a significant amount of human use might indicate the need for disinfection of any upstream wastewater discharges. Any time a stream is added as a classified stream, specific beneficial uses must be assigned. All streams are protected for aquatic life and livestock and wildlife watering, but designation of whole body contact recreation may depend upon evidence of human use.

7. Angel Kruzen, Water Sentinel/Sierra Club, November 5, 2003
213 E. 3rd Street, Mountain View, MO 65548 akruzensc@earthlink.net

Please consider the following:

1. Any stream, river, lake, wetlands, wet meadows, natural ponds, etc., that is within a city should be classified as a waterbody. Where there is water children will migrate- you can't keep them out! They will go over, under, and around any thing that you put in there way. I know because I was one of those city kids even when I got sick from playing in it I went back. We need to protect the children of the State Missouri.
2. I have collected Macroinvertebrates in less then 1 foot of water during dry weather. So to say that a pool has to be at least 1 foot deep is unreasonable.
3. If a landowner won't allow anyone to have access to their land and the chance to classify the stream is then undermined it should be automatically classified.
4. I can understand the method and reasoning for classification. But if a stream/river, etc. is presently classified and the documentation that is submitted now shows that aquatic life no longer exist, shouldn't you be trying to find out what happened to the stream instead of declassifying or changing the classification?
5. I received the Draft Guidelines on Oct 21st at a WQCC meeting. To respond by Nov 7th (17 days) doesn't seem to me to be an adequate time to get the Draft guideline out to everyone that might be interested (such as Stream Teams) and receive comments back.

DNR Response:

Angel, thanks for your comments. I'm particularly thankful to those that met our requested deadline. I certainly agree that waters in towns and other areas with relatively high human density are attractants to children and should be seriously considered for disinfection of wastewaters, prohibition of new wastewater discharges and the elimination, as practical, of existing wastewater discharges. This was the reason for the creation of the “metropolitan no-

discharge” category within our water quality standards. I believe this existing category provides the mechanism to address your concerns about waters in towns.

I agree that macroinvertebrates can be collected in less than one foot of water. The one foot depth was set as an indicator of pool permanence and the ability to maintain water quality throughout the entire dry period. Clearly pools that are much shallower than 1 foot in July are less likely to retain any water as the dry period progresses. Shallower pools also tend to have lower water volume and higher temperatures and thus suffer sooner and more severely from hypoxia.

Access by landowner consent only is certainly a potential problem. I believe the best way to deal with this problem will be to address each incident where access is denied, individually and communicate effectively with landowners.

With regard to changes in classification and the reasons for them, clearly water pollution could impair the invertebrate community or fish community and lead to de-classification. Water quality monitoring and assessment is a routine part of the Water Pollution Control Programs activities. If questions about deteriorating water quality arose concerning a proposed de-classification, the department would certainly make an assessment of water quality of that stream before formally proposing any change through the rule making process.

8. Dorris Bender, City of Independence, November 6, 2003

Thank you for your quick response. I see that I made an error in my comments regarding effluent limits for private lakes. The correct citation should have been 10 CSR 20-7.015(3)(E); i.e., in the Effluent Regs, not the Water Quality Standards.

DNR Response:

Dorris, thanks for catching my error. I have amended the draft guidelines to indicate that the effluent regulation DOES distinguish and provide different effluent treatment levels for discharges to public vs. private lakes. I have then modified the recommendation to eliminate the “public” and “private” designations and to make 10 CSR 20-7.015 (3) treatment requirements (20-20), applicable to all classified lakes.

9. Hans P. Holmberg, P.E, Limno-Tech, Inc., November 6, 2003
Senior Project Engineer, 1326 Birch Park Ridge, Houlton, WI 54082
Phone: 715.549.6740; Fax: 715.549.6741 hholmberg@limno.com www.limno.com

Thank you for your reply. Myself and the Kansas City Water Services Department look forward to working with you and MDNR on these important issues during a very important time for water quality policy in the State. The City would be happy to discuss these and other issues on this topic with MDNR at a time and place that works for you.

Your response points out a very important factor - the existing State rules (10 CSR 20-7) do not include classification categories, or sub-categories, that provide MDNR the needed flexibility to make site-specific classifications that account for effluent dominated streams, constructed channels, significantly altered habitat, and flow modifications (impoundments and releases). Our recommendation is that the rules should first be revised to include an

appropriate range of classifications, providing MDNR a better foundation for developing guidance for classifying streams, and then proceed with making the classifications. We understand and appreciate the urgency with which the Clean Water Commission is trying to address these important issues, but we suggest that the best long-term approach is to improve the rules first to avoid rework and additional complexities down the road.

On a similar note, once a stream or lake is classified, the existing rules do not provide designated use categories, specifically tiered recreational use categories, that are needed to address site-specific conditions and uses. Here again, before guidelines are developed for designating recreational uses using the available use categories in the existing rules, we would be better served by first revising the rules to include a full range of tiered recreational uses, with appropriate numeric criteria and an acceptable wet weather/high flow exemption.

The rules provide the foundation to restore, protect and maintain water quality in the State. Building water quality policy on unsure footing now will likely result in more difficult issues to address later. Much has been learned related to the expectations for water quality (“fishable/swimmable”) set forth in the Clean Water Act in 1972. Many states have and are continuing to struggle with similar issues and much can be learned from their efforts - as I’m sure you’re well aware (for example Colorado’s sub-categories for classification, Indiana’s 3-year approach to setting appropriate recreational uses, and of course Kansas’ on-going struggle with designated uses and most recently a tiered recreational use approach). Kansas City is committed to working with MDNR, the Clean Water Commission, and other interested parties to address these issues and “get it right” now rather than forcing the issues and guidance conform to existing rules, only to have the rules and then the guidance revised later. Again, thank you for the opportunity to comment and we look forward to working with you and contributing to this process.

DNR Response:

Hans, I think your comments are right on target. We are presently drafting changes to our guidelines for designation of recreational waters and it would be desirable to have this change in our standards available to use to help assign beneficial uses to newly classified waters. The same timing would be desirable for new use designations for waters with diminished use potential (effluent dominated waters, tailwaters of large hydropower dams, etc). However, it will probably take us several years to incorporate these new use designations within our standards and thus they would have to be imposed “after the fact” to “old” and “new” classified waters alike.

10. Randy Clarkson, Bartlett & West Engineers, November 10, 2003
600 Monroe Street, Suite 100, Jefferson City, MO 65101 Phone: (573) 634-3181

Thanks for the opportunity to review and comment on the proposed guidelines for determining the classification of streams under the Missouri Water Quality Standards.

1. Many, if not most, small wastewater treatment systems discharge into small streams that would otherwise not be Class C or P streams. In many situations during drought conditions the effluent dries up before reaching a Class C or P stream segment. A proposal for dealing with these situations should be developed that provides for the

continued utilization of non-mechanical treatment systems in low population density rural areas.

2. The approach that will be used for effluent dominated streams that maintain flow only because of wastewater treatment plant effluent also needs to be carefully considered. Will these now be classified? What impact will that have on determining effluent limitations? For example, will the ammonia decay that occurs in the portion of the stream upstream of the stream segment that would otherwise be classified be credited when determining the effluent ammonia limit?

3. One way to address the issues raised in items No. 1 & 2 above would be to establish that only watersheds over a certain size and/or with a minimum stream length can be classified. Exceptions could be made for unusual conditions such as spring-fed watersheds or watersheds in high population areas.

Thanks again for the opportunity to review and comment on these draft guidelines and please keep me informed regarding this very important matter.

DNR Response:

Randy, thanks for your comments. On Item No. 1, our proposed guidelines would not classify effluent dominated streams if there was an intervening segment of dry streambed between the effluent dominated stream and the existing classified stream network. I believe that most lagoon systems and many small mechanical plants in the upper portions of watersheds would either have intermittent flow or very small flows that would prevent the immediate portions of their receiving streams from being classified under our proposed guidelines.

On Item No. 2, for those effluent dominated streams that do become classified streams, all existing water quality standards and their method of application would be identical to all other classified streams in the same circumstances.

On Item No. 3, I agree that we should probably look more closely at possible exceptions to including all effluent dominated streams that connect directly to the classified network.

11. Caitlyn Peel, Home Builders Association of Greater St. Louis, November 6, 2003

1. Ephemeral (unclassified) streams should be added to this set of guidelines.
2. Lake classifications guidelines were generally OK, but suggest you use volume rather than surface area for delineating L2 and L3 lakes. Agree with proposed deletion of reference to private vs. public lakes.
3. Wetland type should be included and educational requirements for wetland delineation is a good idea.
4. Calendar window for "drought" determination should start August 1.
5. Class P determination must occur during "drought season."
6. DNR should consider minimum educational/experience requirements for classifications other than Class C streams.
7. Submittal of all materials in Microsoft office may be difficult.

DNR Response:

1. DNR believes the narrative criteria within the water quality standards already adequately cover unclassified (ephemeral) streams.
2. Class P determinate must be done during the defined “drought period.”
3. The intent of the guidelines was to request text information in Microsoft compatible software, not necessarily the photos or maps, but the wording is certainly not clear. We will try to change the wording to state that a paper copy of the report and any necessary maps or photos should be submitted in Microsoft compatible electronic form if possible but that this is not an absolute requirement.

Comments Received during the January 29- February 29 Public Notice and Department Responses

COMMENT 1: In Section 7.2, the guidelines allow effluent dominated streams of at least 0.25 miles to be classified if they connect to a previously classified stream. These effluent dominated streams should have visible flow throughout 100 percent of their length.

RESPONSE : The discussion of percent visible flow notes that water quality and water replacement appear to be important benefits to aquatic life from flowing water in small streams. Thus there is merit in suggesting that effluent dominated waters, which normally contain greater concentrations of oxygen-demanding substances, may need more aeration (should have a higher percent of visible surface flow) than non-effluent dominated streams to realize this benefit of flow. However, we believe that requiring 100 percent of the segment length to have visible flow is probably too restrictive. The department proposes to modify the guidelines to require that at least 90 percent of these effluent dominated candidate streams have visible surface water.

COMMENT 2: The Department should include with the guidelines a recommendation to revise State Water Quality Standards to include alternate beneficial use classifications for certain waters such as effluent dominated streams.

RESPONSE: We agree that this recommendation is appropriate.

COMMENT 3: Guideline 8.1.2 may eliminate bona fide Class C candidate streams if they cannot meet the biological criterion due to water quality problems. This appears to be especially problematic for urban streams, which typically suffer substantial hydrologic modification, and pollution related to both point and nonpoint sources. Guideline 8.1.2 should be deleted.

RESPONSE: This issue was discussed in our initial communication with stakeholders. The concern is valid and the department suggests this approach to address this problem. First conduct studies to determine if a specific pollutant or condition exists to the extent that it affects the aquatic biological community. If no such pollutant or condition is found, use Guideline 8.1.2. If a specific pollutant or condition is believed to be affecting the aquatic biota, do not make Guideline 8.1.2 a requirement and rely on the best professional judgement of the aquatic biologists reviewing the data which is discussed in Section 10.

COMMENT 4: All unclassified streams need to be protected by numeric criteria in State Water Quality Standards.

RESPONSE: Since the comment did not address any of the specifics in the proposed guidelines, no changes are proposed in response to this comment. The commentor was apprised of the water quality standards revision process and it was suggested this was the proper venue for this comment.

Public Comments at the August 4, 2004 Commission Meeting

Comment 1: A effluent dominated stream could be erroneously classified as a Class P stream if the effluent source was an intermittent source. The guidelines should address this issue.

Response: We have added wording to Criterion 7.2, page 9-10 to explain that to become Class P, an effluent dominated stream must come from a facility which, under normal operating conditions, provides a permanent (continuous) discharge.

Comment 2. Permitting classification of an effluent dominated stream is a significant policy change by the department.

Response: We do not believe this represents a significant change in policy. Many of our presently classified streams begin at the outfall of a wastewater treatment plant. I have discussed this issue with Dick Duchrow who for many years coordinated the Dept. of Conservation comments on stream classification during our Water Quality Standards review process. Dick says that the guidance he received from DNR on how to evaluate class P streams involved only the presence or absence of flowing water and there was no consideration of the presence or absence of a wastewater discharge. Thus guidance clearly indicates that permanency of flow solely due to a wastewater discharge has been permissible in the past and our present guidelines do not represent a change in policy.

Comment 3. The one foot depth criterion for Class C streams is too restrictive.

Response: A meeting of the workgroup and the commenter was held after the Commission meeting. As a result of this meeting, the guidelines are proposed to be amended in the following manner: Deleted the one-foot minimum depth requirement in Criterion 8.1.1, page 11, as a pre-condition for doing the fieldwork to determine Class C candidacy. This does not change the criteria for Class C streams but does allow more streams to be assessed using those criteria.

Comments at the November 1, 2004 Stakeholders Meeting and Subsequent Follow-up Comments

Comment 1. There are nine pretreatment programs on unclassified streams. If these streams become classified, pretreatment requirements could be increased for the affected industries.

Response: We agree that the decision as to whether a stream should be a Class C or an unclassified stream may have important economic as well as environmental consequences. That is why the Clean Water Commission tasked the department with developing these guidelines and insuring that they have a firm, sound technical basis for making this decision.

Comment 2. New wastewater treatment facilities on unclassified streams will not know whether or not the receiving stream will remain unclassified in the future or become a classified stream.

Response: This situation would exist with or without the proposed guidance. We believe the detail in the guidance will actually help the facility owner and their consultants to make a much more informed decision about the future potential for a change in the classification of a particular stream and to plan the design of the wastewater treatment facilities accordingly.

Comment 3. Effluent dominated streams should not be considered for classification until a special use designation for these streams is promulgated within the state's water quality standards regulation.

Response: The department agrees and has added wording to the guidelines to this effect.

Comment 4. Footnote 4 on Page 9 refers to a department UAA protocol which does not yet exist. Suggest the department substitute the EPA UAA protocol and its citation.

Response: The department agrees and has made this change in Footnote 4.

Appendix G

Field Forms

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Pool Survey Field Data Sheet

(A separate data sheet must be completed for each pool)

Stream Name:	Location:
Site ID:	Description:
Date:	
Personnel:	
Weather Now:	Upstream Pool Coordinates: (UGS 84, ddd.ddddd)
Weather past 24 hours:	Downstream Pool Coordinates: (UGS 84, ddd.ddddd)
Weather past 7 days:	Photo Ids:

Pool Morphology:

Width (ft):	Substrate:
Depth (ft):	Channelization?:
Length (ft):	Dam or other impediments to flow?:

Local Land Use:

% Forest	% Hayfield	% Row Crops	% Grazing	% Animal Confinement
% Urban / Commercial	% Urban / Industrial	% Suburban / Residential	% Suburban / Commercial	% Other:

Potential Water Sources:

<input type="checkbox"/> spring fed	<input type="checkbox"/> runoff	<input type="checkbox"/> effluent	<input type="checkbox"/> other:	Describe:
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Riparian Zone:

% Trees:	% Shrub:	% Grass:	% bare:	% row crops:
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Aquatic Vegetation in pool:

% Rooted emergent:	% Rooted submergent:	% Rooted floating:	% Free floating:	% Floating algae:	% Attached algae:
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Water Chemistry: (if additional tests are done, attach results separately)

Temp:	Spec Cond:	DO:	pH:	Turbidity:
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Human Disturbance: (Auto parking, footpaths, campsites, fishing tackle, ATVs, gravel mining, etc.)

Signs of Livestock Use: (fences, footprints, manure, etc.)

Description of Pool Conditions: (odors, surface sheens, discoloration, bottom deposits, trash)

Aquatic Life Survey Field Data Sheet

(A separate data sheet must be completed for each pool)

Unionid Mussel Field Data

Live Specimens: <input type="checkbox"/> Yes <input type="checkbox"/> No	Weathered Shell Material: <input type="checkbox"/> Yes <input type="checkbox"/> No	<u>Do not collect any mussel specimens!</u>
Photo Ids:		

Fish Collection Field Data (use additional sheets if necessary)

Visual Identification: <input type="checkbox"/> Yes <input type="checkbox"/> No	Seining: <input type="checkbox"/> Yes <input type="checkbox"/> No	Electrofishing: <input type="checkbox"/> Yes <input type="checkbox"/> No
Type (Family name)		Number

Macroinvertebrate Collection Field Data (use additional sheets if necessary)

Specimens of macroinvertebrates must be preserved & submitted to DNR for verification	Identified by:
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Taxa Name	Number per Habitat Type:		
	Woody Debris	Rootmat	Depositional

Stream Candidacy Field Data Sheet

Only one Stream Candidacy Field Data Sheet is needed per segment requested for classification

Stream Name:	Location:
Date:	
Personnel:	
Upstream Stream Coordinates: (UGS 84, ddd.ddddd)	Upstream Legal Description:
Downstream Stream Coordinates: (UGS 84, ddd.ddddd)	Downstream Legal Description:

Criterion 1:

Pool #	Maximum Depth (ft)	Pool Length (ft)	

Number of Pools with depths greater than 1ft = _____

Total length of pools with depths greater than 1ft = _____

Total length of stream requested for classification = _____

Percent of stream length pooled (total pool length / total stream length) = _____

Criterion 2:

Group 1 Taxa	Present	Group 2 Taxa	Present	Group 3 Taxa	Present
Ephemeroptera		Riffle Beetles		Amphipods	
Plecoptera		Crawfish		Isopods	
Tricoptera		Dragonfly larvae		Damselfly larvae	
Megaloptera		Alderfly larvae		Other beetles	
Water Pennies				Aquatic worms	
				Snails	
				Diptera (other than Chironomids)	

Taxa Scores:

Number of Group 1 taxa represented x3 =		Number of Group 2 taxa represented x2 =		Number of Group 3 taxa represented x1 =		Sum of taxa scores:	
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Appendix H

Unresolved Issues

The issues raised by stakeholders or those responding to the public notice that are discussed below have not been totally resolved.

Unresolved Issues

1. If a Class C candidate stream has impaired water quality, it may fail to meet the biological requirements for Class C status in these guidelines due solely to water quality or other anthropogenic problems. At least one comment suggested deleting this requirement for this reason. However, another comment was in favor of retaining these biological guidelines for all candidates. The department recommends retaining this guideline, but giving the interagency review committee the latitude to waive this guideline on a case by case basis. If an anthropogenic problem was one that would qualify a classified waterbody for removal of the Protection of Aquatic Life beneficial use as per USEPA's Use Attainability Analysis procedures, the department would not recommend classification of this candidate water. Appendix C, page 20 suggests a target metric score for invertebrates below which the department could choose to investigate the possibility of water pollution as a cause of poor invertebrate diversity.
2. One comment suggested that the guidelines addressing effluent-dominated streams and their classification represented a significant policy change by the department and that the guidelines should include an analysis of the potential consequences of these guidelines and provide possible alternative approaches, with opportunity for public comment. Due to the significant amount of resources that would be required, the department has not done this analysis. The department is unsure of the value of such an analysis since USEPA policy guidelines indicate that effluent-dominated streams must be protected for all appropriate beneficial uses unless there are reasons other than water quality that would prohibit maintenance of that use. Additionally, the department does not believe this represents a change in policy. It has been the department's practice, as new information on streamflow becomes available, to amend the water quality standards to reflect these new flow conditions. The department has amended the guidelines to indicate that consideration of effluent dominated streams for classification will be delayed until a special beneficial use category has been established for effluent dominated streams with state water quality standards.
3. Another similar comment did not believe that an effluent-dominated stream should be given Class P status if it flowed into a Class C stream. The department believes that since Class C streams, by definition, provide a dry weather refuge for aquatic life, that they provide access to aquatic life to the upstream effluent-dominated class P stream and that the upstream effluent-dominated stream is therefore bona fide aquatic habitat. The guidelines do not recommend giving Class P status to permanently flowing effluent-dominated streams if they are not directly connected to classified stream, since an intervening gap would preclude access by aquatic life to the effluent-dominated segment.
4. One comment was concerned that failure to obtain landowner approval to access the candidate site could prevent a stream from receiving the additional protection bestowed by classification. If and when this situation occurred, the department would make

attempts to gain landowner permission through follow-up communications. However, these guidelines do not set up a formal procedure for addressing this situation.

5. One comment suggested the lake criterion should be based on lake volume rather than surface area. The department recommends use of surface area at this time since this type of data is available or easily obtainable for all lakes while lake volume information is not available or readily obtainable for many, if not most lakes.
6. One comment suggested the “dry period” defined in these guidelines should begin August 1, rather than July 15. The department recommends the use of the July 15 date since that would give those making field measurements in support of candidacy an additional 16 days to do this work.
7. One comment suggested that 100% of the candidate segment should have visible surface water during the defined “dry period” to be rated as a Class P stream. The department’s recommendation is 70% visible surface flow for non-effluent-dependent waters and 90% visible flow for effluent-dependent waters. The rationale for these figures are given in the recommended guidelines.
8. Some comments received pertained to suggested changes in 10 CSR 20-7.031 Water Quality Standards. These comments were not addressed in these guidelines and all commentors were informed that their comments needed to be directed to the Water Quality Standards revision process.